






Europe's Second Winter Without Russian Gas: The Role of American LNG Exports

ELAN SYKES
PROGRESSIVE POLICY INSTITUTE

DECEMBER 2023



 @ppi |  @progressivepolicyinstitute |  /progressive-policy-institute

American LNG in the Second Winter Without Russian Gas

ELAN SYKES

DECEMBER 2023

EXECUTIVE SUMMARY

Approaching the second winter after Russia's invasion of Ukraine, the European Union has made real progress in overcoming the severe energy shortage that followed the August 2022 shutdown of the Nord Stream pipelines. Through the first nine months of this year, Russian gas comprised only 6% of EU imports compared to 38% in pre-pandemic 2019.¹

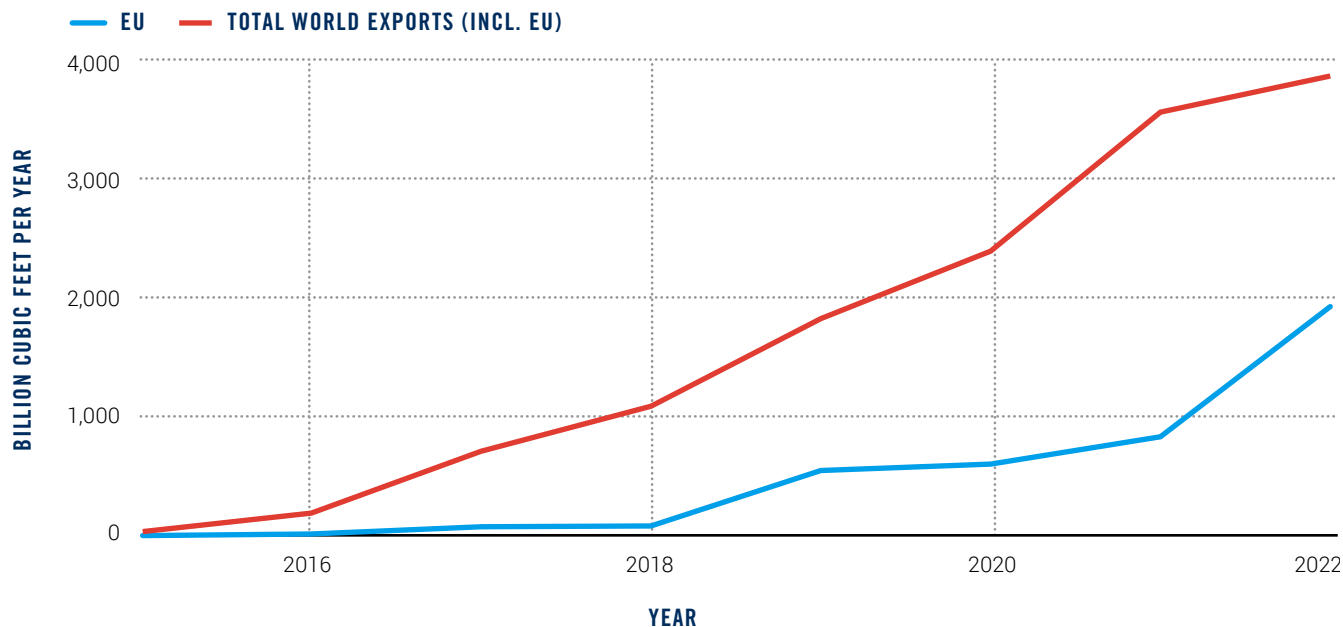
More than any other supplier, United States exports of Liquefied Natural Gas (LNG) have stepped in to fill the gap: U.S. exports are at all-time historic highs and America is now the single largest LNG exporter in the world, with roughly half of U.S. cargoes going to Europe since the invasion and America rising to become the second-largest supplier of gas to Europe after only Norway.

It is impossible to imagine unified support for Ukraine between the U.S. and EU could have continued as it did without the long-term project of expanding U.S. export capacity and the rapid short-term expansion of import terminals in Europe. The EU paired the rapid expansion of temporary and permanent new LNG import terminals with demand reduction targets, accelerated deployment of renewable energy and electrified heating, and increased coal combustion; though European energy costs remain high and energy-intensive industry has languished, the shortage is no longer an acute crisis. In the near future, the U.S. should build on this success by continuing to play a backstop role for world energy markets, implement ambitious IRA policies to push down upstream methane leakage, and expand the global coalition of low-methane producer and consumer

markets for LNG with stringent and transparent certification metrics. The U.S. is leading this

pragmatic and orderly global transition to net-zero.

FIGURE 1: ANNUAL EXPORTS OF U.S. LNG



INTRODUCTION

The European Union made it through the last year with a combination of increased LNG imports, burning more coal, demand reduction, high costs for households and industry, and luck with warm winter weather. In that time, American LNG exports played a crucial role in filling the European energy gap. The first half of 2023 set a historic record for U.S. exports as the largest global exporter of LNG and as the half-year with the most American exports of any six-month period in history.²

Much of the assistance to Europe came at the expense of alternative export markets, especially in East Asia, but the acute phase of the shortage is over. Still, these cuts to other markets in the meantime have real consequences. More U.S. export capacity is set to come online in coming

years along with other supplies from Australia and new exporting countries like Mozambique,³ but the risk that would-be importers revert to coal combustion for power, and that industry shifts production from relatively clean industrial countries that usually import significant cargoes of American LNG like Japan and South Korea to coal-based production in China, will continue until the supply chains for next-generation clean firm power generation, building heating and cooling, and industrial decarbonization technologies reach maturity.

Moving forward, the American LNG export market should focus on providing LNG to our democratic allies and countries with particularly coal-intensive energy systems and the U.S. government should support this effort by pursuing domestic and international climate

and trade policies that reward low-methane producers and shippers. Looking further into the future, the case of European overreliance on Russian gas supplies and the relative success of U.S. and EU response should serve as a lesson for the energy transition that highlights the value of three key objectives: supply chain diversity, methane efficiency, and pragmatic all-of-the-above decarbonization.

Without the increased flexibility of LNG supply chains in recent years, the EU would never have been able to risk its pipeline energy supply by standing with the U.S. in support of Ukraine, or else would have been forced into such severe energy shortages that industry and households would have suffered extreme consequences. Meanwhile, outside of existing LNG exports Russian gas is largely stranded by a lack of alternative infrastructure capacity to replace pipeline flows, cutting off a key source of funding and potential influence for President Putin's regime. Expanding European import capacity with Floating Storage and Regasification Units (FSRUs) and with an eye toward potential conversion to hydrogen imports has ensured that European import flexibility will extend forward.⁴ Diverse and flexible supply chains, both in geographic terms and in type of energy technology, must be maintained or built anew if the U.S., Europe, and eventually the world are to succeed in transitioning to a net-zero economy.

Achieving ultra-low methane leakage rates along the whole natural gas supply chain, especially in the U.S. domestic context through incentives in the Inflation Reduction Act, including methane reduction grants and methane pricing, will help maximize efficiency on the business side as well as reduce atmospheric concentrations of the potent short-term-warming gas. Further policy support through the creation of hubs focused

on blue hydrogen in the Appalachian, Midwest, Heartland, and Gulf Coast hubs⁵ and CCUS investment will help move the innovation frontier forward and clarify the role of natural gas in a net-zero future.

Domestic left-wing opponents of U.S. LNG exports argue that new export infrastructure locks in emissions increases and slows the transition to clean energy, but these arguments ignore second-order effects, both in the choice of energy supply and in the political momentum necessary to implement a popularly supported energy transition. As the European shortage has shown, countries short on gas cannot simply reduce demand until a completed energy transition several decades from now but rather will turn to coal or shut down energy-intensive production. In turn, imports from other coal-intensive countries will replace domestic production and offshore those emissions. Left environmentalists like Bill McKibben have attempted to show that LNG emissions are higher than coal because of liquefaction and transport emissions.⁶ Policies outlined above to coordinate on standards for upstream methane mitigation and shipping emissions must certainly be adopted in order to reduce the methane emissions associated with LNG exports, but the Howarth models that McKibben cites rely on dated 30-year-old figures for coal mine methane emissions that more recent research has found to be much higher even than current official estimates.⁷ And coal is not only a dirty substitute for gas in electricity production in terms of direct greenhouse gas and air pollutant emissions, but also works as a baseload power source that lacks the fast-ramping quality of many natural gas plants that makes the latter so important in balancing intermittent renewable sources on contemporary electricity grids.

Combining flexibility and pragmatism on the supply side with well-targeted demand-side policies for relatively easier-to-replace gas uses in home heating, cooking, and baseload energy will ensure that gas use can be focused on high-temperature industrial uses and quick-ramping power generation to complement intermittent renewables, which will be the most valuable and important applications for natural gas through the energy transition.

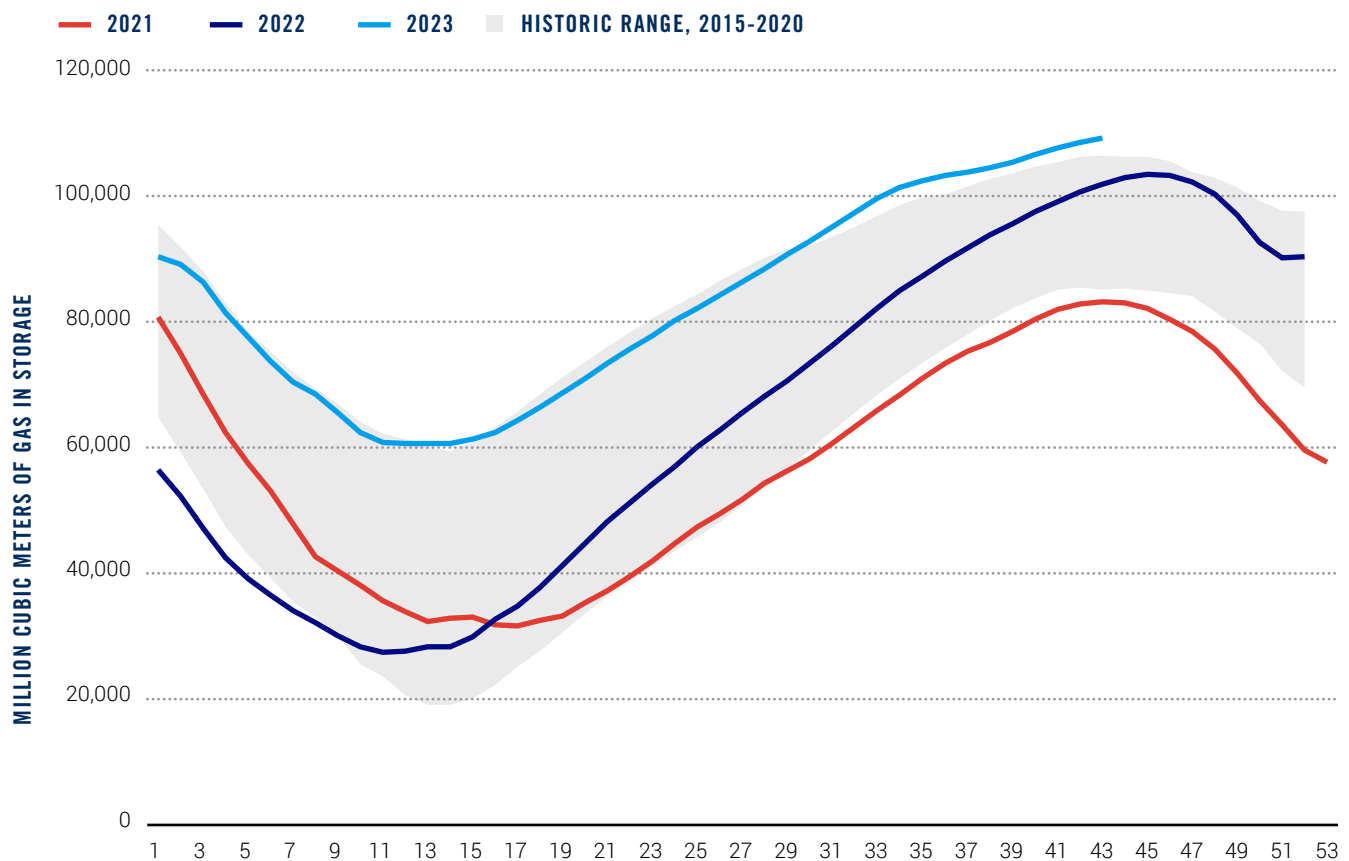
EUROPEAN SHORTAGE

Aided by relatively warm weather, Europe came out of Winter 2022-2023 with gas in storage

at historic levels.⁸ Since then, the EU has been in a race to expand import terminals, storage infrastructure, and a whole suite of investments in alternative energy sources and efficiency solutions to ensure that a colder winter or higher global gas demand do not cause an insurmountable crisis.⁹

As the data compiled by European think tank Bruegel show, the investment in storage has paid off and the EU is entering winter 2023-2024 with more gas stored across the continent than in any year from 2015 to 2020:

FIGURE 2: NEW CAPACITY AND HIGH IMPORTS HAVE RAISED EUROPEAN GAS STORAGE TO RECORD LEVELS



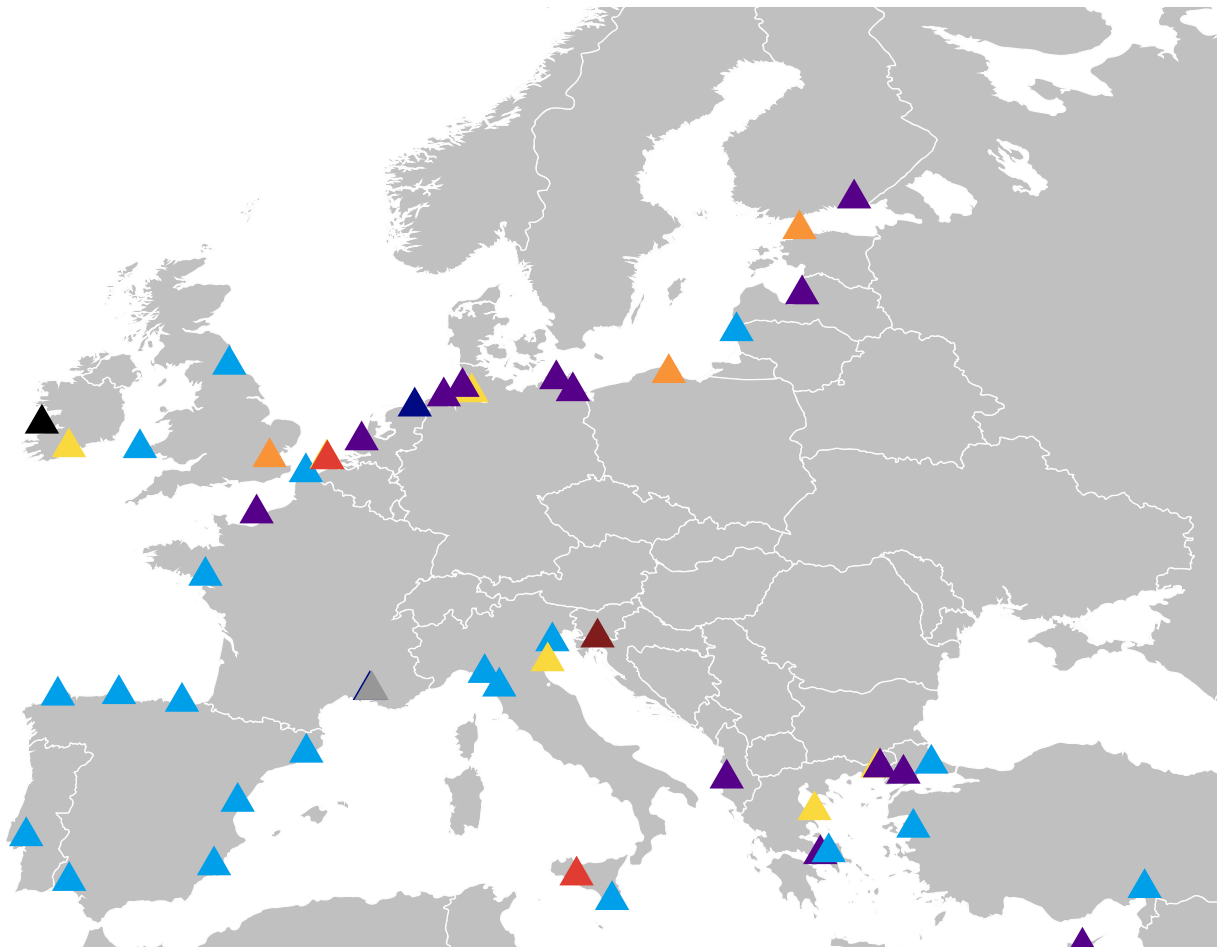
Source: Bruegel¹⁰

Regasification capacity, a key bottleneck in the natural gas import supply chain, also expanded significantly across the EU in the past year.

Germany in particular responded to the crisis by commissioning five new terminals, most of them starting as FSRUs.

FIGURE 3: LNG REGASIFICATION TERMINALS IN EUROPE

START UP YEAR: ■ 2021* ■ 2022 ■ 2023 ■ 2024 ■ 2025 ■ 2026 ■ 2029 ■ 2030 ■ SUSPENDED

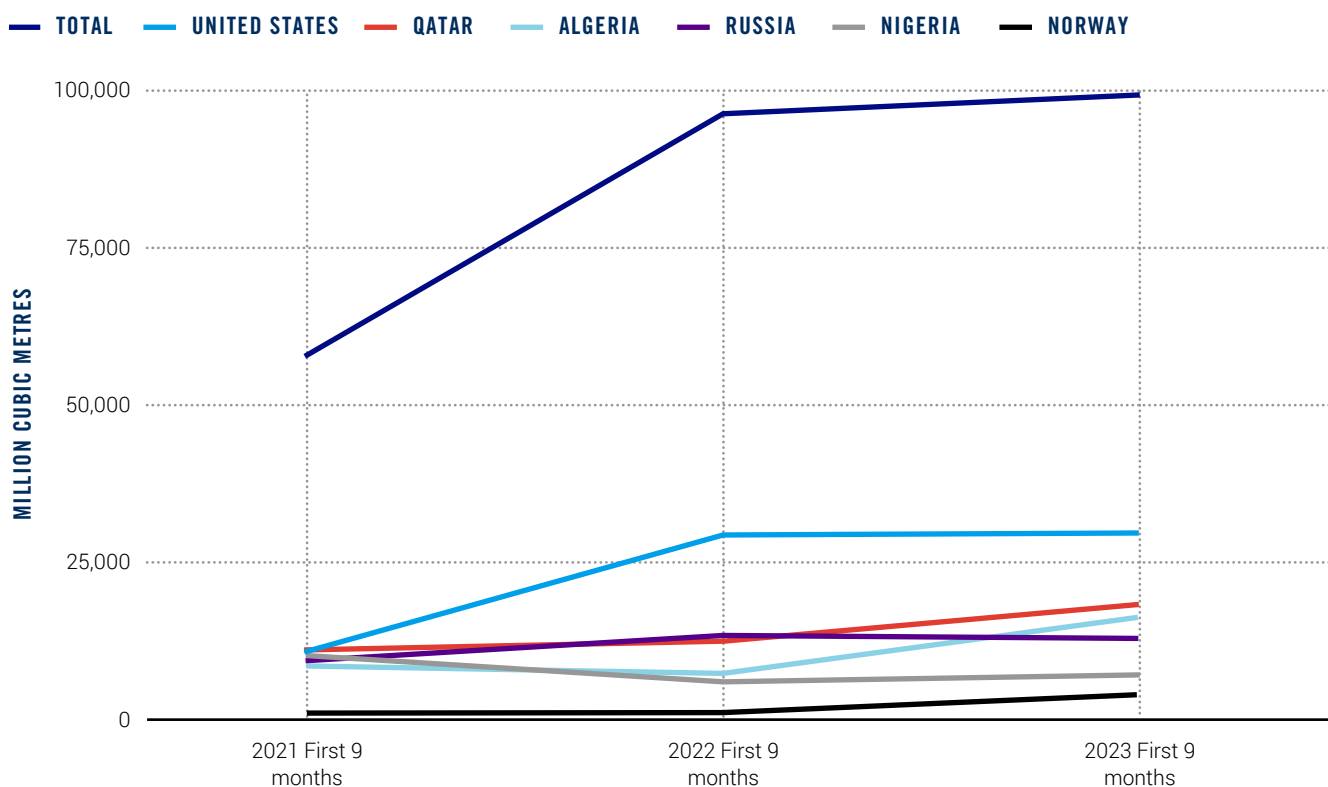


Source: Gas Infrastructure Europe, IEEFA • *Terminals installed in or before 2021.¹¹

The EU's gas import data show how overall LNG imports in the first nine months of this year have reached nearly double the same period from pre-

invasion 2021.¹² From a relatively even pre-war mix, the U.S. has shot up to serve as the clear leader among the EU's overseas suppliers:

FIGURE 4: TOP LNG SUPPLIERS TO THE EU



Source: Eurostat.¹³

The picture shifts slightly when considering pipeline-transported gas from nearby North African and Norwegian gas fields, but even taking those into account, only Norway has exported more total gas to the EU than the U.S. so far in 2023.¹⁴

Paired with the expansion of import and storage infrastructure, the EU has also worked hard to supply alternatives and manage reductions in gas demand. The bloc adopted a 15% gas reduction target in August 2022, and extended it in March of this year through March 2024. The picture shifts slightly when considering pipeline-transported gas from nearby North African and Norwegian gas fields, but even taking those into account, only Norway has exported more total

gas to the EU than the U.S. so far in 2023.

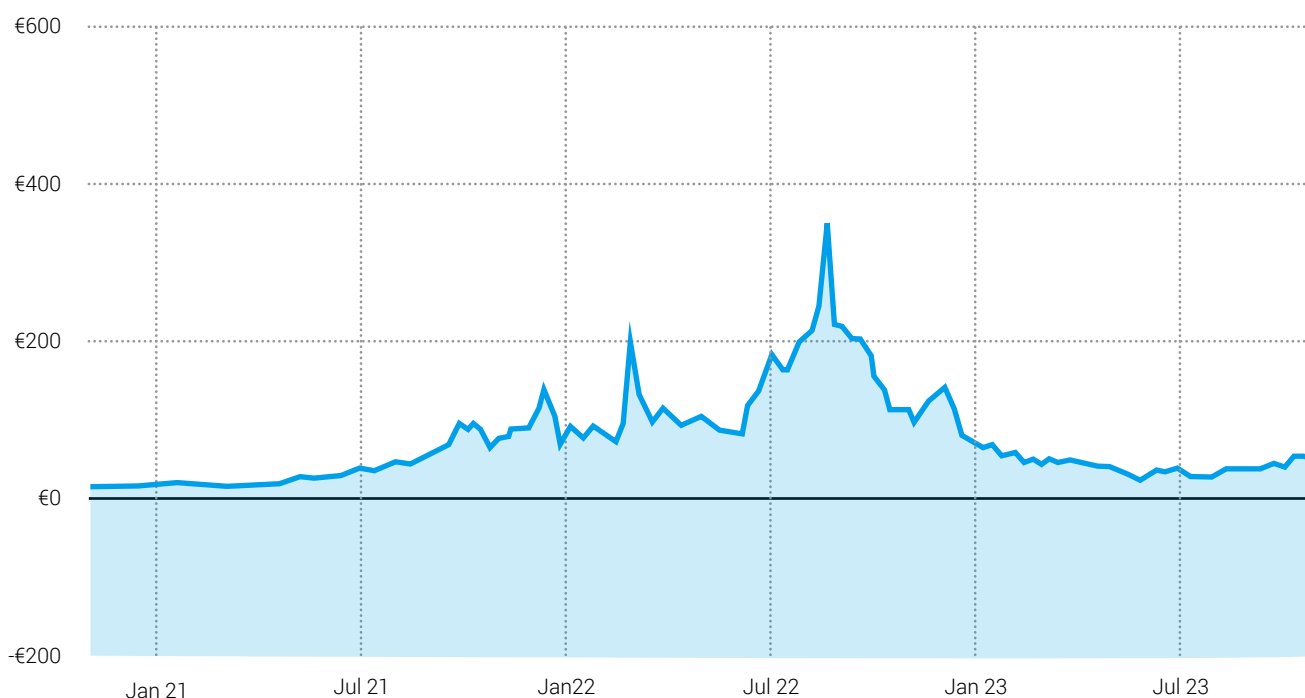
Paired with the expansion of import and storage infrastructure, the EU has also worked hard to supply alternatives and manage reductions in gas demand. The bloc adopted a 15% gas reduction target in August 2022, and extended it in March of this year through March 2024.¹⁵

Data from Bruegel show that the EU achieved a 12% demand reduction over the course of 2022, and then reached and narrowly exceeded the target in the first half of 2023.¹⁶ Energy-intensive industries like the chemicals sector have suffered especially harsh downturns, and large firms like BASF and steel producer ArcelorMittal are actively seeking new sources

of LNG from the U.S. to make up their shortfall.¹⁷ The distribution of demand reduction between residential, industrial, and power generation uses varied widely across countries and time of year but fell roughly even for the EU as a whole.¹⁸ Paired with the gas reduction target, the EU wisely enacted a series of permitting reforms to speed up the deployment of renewable energy and transmission infrastructure to help ease the shortage.¹⁹

The massive effort made by both the EU and the U.S. to respond to the shortage is reflected in the European gas futures price data. In response to the Nord Stream's destruction in the summer of 2022, the price of European natural gas futures skyrocketed, reaching a peak of €350 for one day in August. As the chart below shows, prices then declined through the end of last year and have remained roughly even throughout 2023:

FIGURE 5: DUTCH TTF GAS MONTHLY CONTINUOUS CONTRACT



Source: <https://www.marketwatch.com/investing/future/tfmi00?countrycode=uk>.²⁰

So, the EU has made it through one winter and heads into its second winter without pre-war quantities of Russian gas in a much better position thanks to a mix of investment in import and storage infrastructure, demand reduction, and alternative energy investments. But if

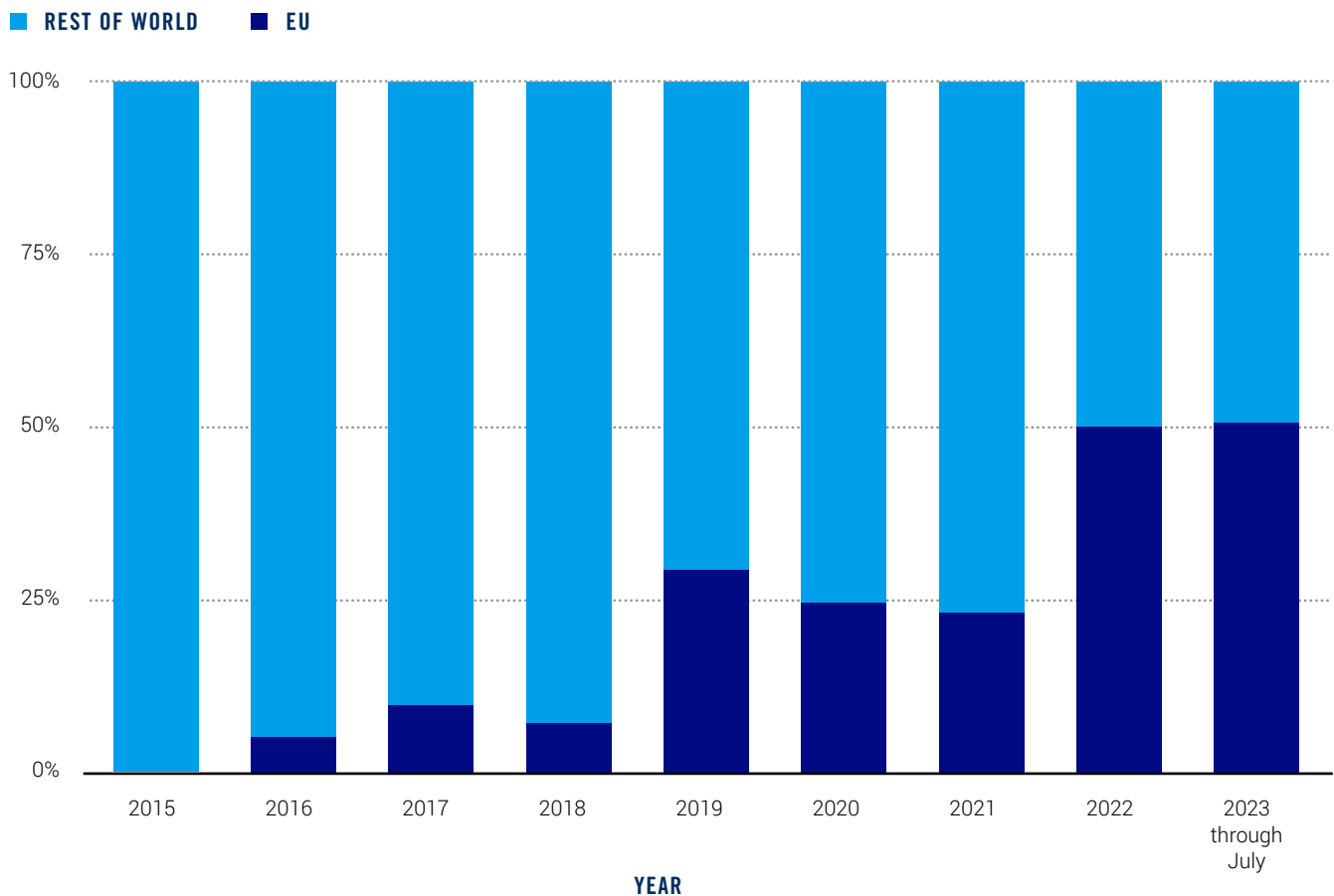
the vision of a modern, industrial, low-carbon economy for Europe is to move beyond mere survival and return to the path of growth, more work remains to be done.

THE UNITED STATES: A GREENING AND GROWING SUPPLIER

The United States growing into its role as the biggest LNG export superpower in 2023 has allowed America to serve as a key swing producer in global energy markets and as an

energy backstop for our transatlantic democratic allies. The figure below shows that the share of U.S. LNG exports to Europe skyrocketed in 2022 to make up for the Russian shortfall, and the EU has maintained its 50% share of American exports through July of this year:

FIGURE 6: YEAR-OVER-YEAR SHARE OF EU-BOUND U.S. LNG EXPORTS



Source: EIA²¹

Within the EU, the list of top importing countries for U.S. LNG has largely remained the same with one major shift: as new import terminals came online, Germany has increased American

LNG imports by sixteen times, all the way from 7 bcf in all of last year to nearly 115 bcf in 2023 through July and climbing into the ranks of top European importers.²²

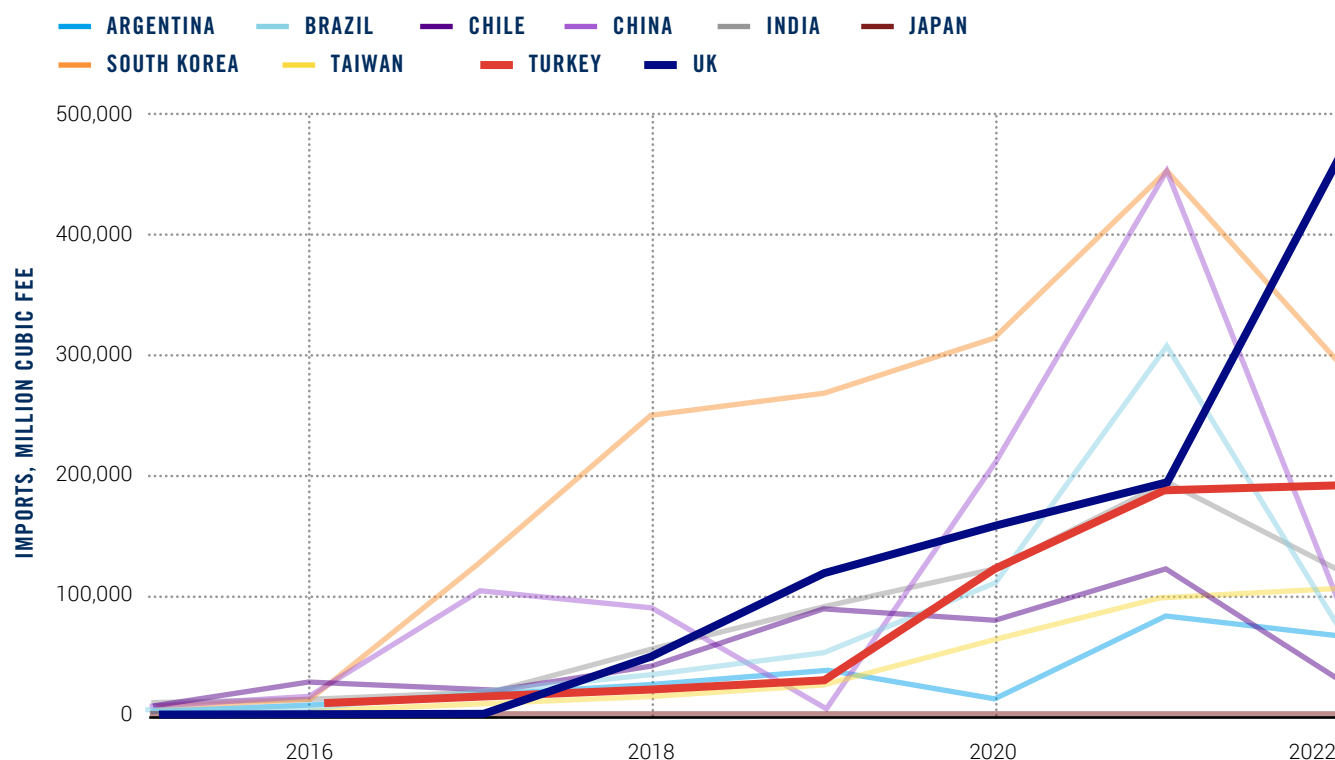
TABLE 1: TOP IMPORTING COUNTRIES OF U.S. LNG WITHIN THE EU

TOP IMPORTERS 2022	MCF IMPORTED	TOP IMPORTERS 2023 THROUGH JULY	MCF IMPORTED
FRANCE	571,398.00	NETHERLANDS	356,858.00
SPAIN	426,657.00	FRANCE	273,189.00
NETHERLANDS	378,331.00	SPAIN	156,547.00
POLAND	127,404.00	GERMANY	114,946.00
ITALY	116,034.00	ITALY	105,138.00

Like last year, the increase in EU imports of U.S. gas has come at the expense of other major world importers. Of the countries that imported American LNG cargo totals in the billions of cubic feet prior to the invasion, only the United

Kingdom has significantly increased imports (with Turkey holding roughly steady) while major East Asian and South American trading partners saw major decreases:

FIGURE 7: U.S. EXPORTS OF LNG TO OTHER MAJOR IMPORTERS DECLINED, WITH THE EXCEPTION OF EU-NEIGHBOURING UK AND TURKEY

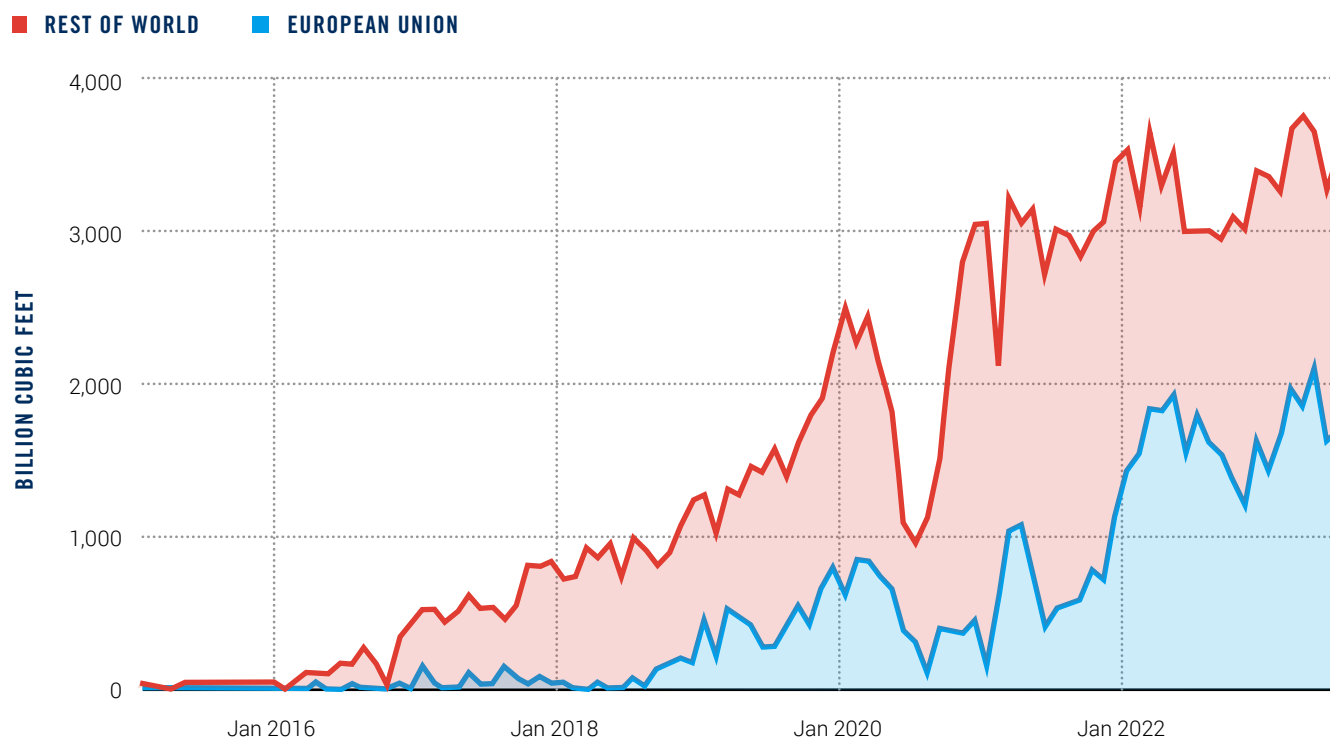


Source: EIA²³

So while overall exports from the U.S. have increased significantly in recent years, the available capacity has not expanded by enough

to supply both the EU and other important global consumers since the invasion:

FIGURE 8: MONTHLY U.S. LNG EXPORTS, EU VS REST OF WORLD

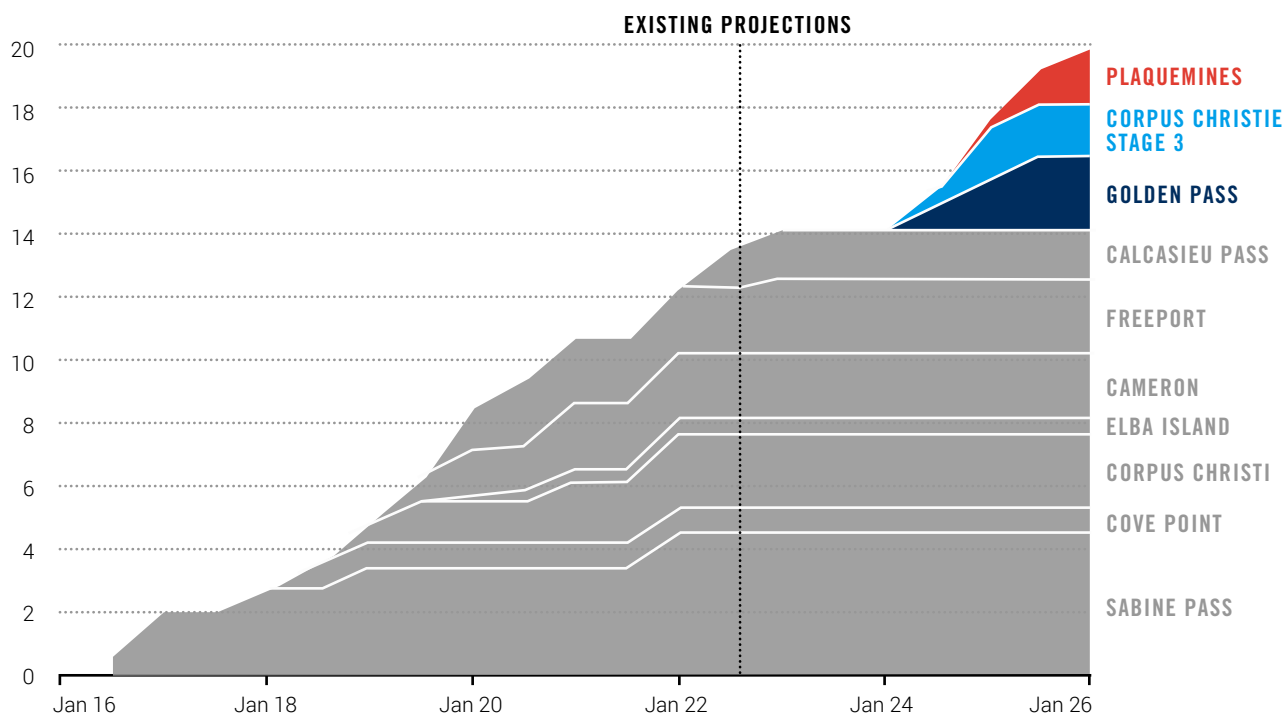


Source: EIA²⁴

Looking ahead, several more LNG terminals are on track to be constructed in the U.S. in the coming years. While some domestic opponents of LNG exports argue that export infrastructure will impose unmanageable costs on U.S. consumers, the EIA's modeling of LNG

exports and domestic prices do not show insurmountable price increases for domestic consumers even under generous assumptions about world energy prices and aggressive expansion of export capacity.²⁵

FIGURE 9: U.S. LIQUEFIED NATURAL GAS EXPORT PROJECTS: EXISTING AND UNDER CONSTRUCTION (2016-2025)
(BILLION CUBIC FEET PER DAY)



Source: EIA²⁶

Paired with the suite of methane reduction policies in the Inflation Reduction Act, this export capacity expansion has the potential to position U.S. producers as the go-to supply source in global markets for especially low-leakage LNG. And those policies are promising: the EPA's Methane Emissions Reduction Program includes roughly \$1.5 billion in grants, technical assistance, and state funding for mitigation.²⁷ Additionally, especially leaky oil and gas suppliers will be subject to a methane waste emissions charge that will create the first greenhouse gas pricing system in the U.S.²⁸

Working internationally, the U.S. has partnered with fellow exporter Australia and major importers Japan and South Korea along with the EU on the initiative titled the Coalition for LNG Emission Abatement towards Net-zero (CLEAN)

to coordinate efforts between producers and consumers looking to push methane emissions from global gas downward.²⁹ Professor Arvind Ravikumar at the University of Texas's Energy Emissions Modeling and Data Lab has laid out an ambitious vision of modern data analytics built on stringent monitoring and verification mechanisms necessary to build out a verifiably differentiated gas market.³⁰ Major methane emitters like China, India, and Russia have not yet signed the Global Methane Pledge, but work to expand the voluntary coalition could run alongside an integrated climate and trade policy framework like PPI's proposed Alliance for Clean Trade to incentivize participation.³¹ Effective mitigation of methane emissions is a must-have for the industry to achieve the targets that PPI has envisioned in past reports.³²

CONCLUSION

Ensuring that existing gas demand is met with low-methane supply, that countries dedicated to the energy transition can maintain workable markets for an energy commodity crucial to maintaining our energy systems throughout that process, and that popular support for the transition does not falter due to severe shortage, price spikes, or a disorderly transition that lends itself to the perception of unworkability. The U.S. is well-positioned to serve as a low-methane backstop LNG supplier while complementary clean energy supply chains scale up as rapidly as possible.

ABOUT THE AUTHOR

Elan Sykes is an Energy Policy Analyst at PPI, working on energy deployment, innovation, and decarbonization.

References

- 1 "Imports of Natural Gas by Partner Country (NRG_TI_GAS)," Eurostat (European Commission), November 2023, https://ec.europa.eu/eurostat/databrowser/view/NRG_TI_GAS__custom_3756240/default/table?lang=en.
- 2 Victoria Zaretskaya, "The United States Became the World's Largest LNG Exporter in the First Half of 2022," U.S. Energy Information Administration (EIA), December 27, 2022, <https://www.eia.gov/todayinenergy/detail.php?id=55025>; Katy Fleury, "U.S. Exports of Natural Gas Set a Record High in the First Half of 2023," U.S. Energy Information Administration (EIA), October 4, 2023, <https://www.eia.gov/todayinenergy/detail.php?id=60582>.
- 3 "Amid Gas Scramble, Africa Leads a Boom in Nimble Export Facilities," *Reuters via Gas Processing & LNG News*, October 20, 2023, <http://www.gasprocessingnews.com/news/2023/10/amid-gas-scramble-africa-leads-a-boom-in-nimble-export-facilities/>.
- 4 Paul W Parfomak and John Frittelli, "LNG Exports to Europe: What Are Floating Storage Regasification Units (FSRUs)?," Congressional Research Service, June 22, 2022, <https://crsreports.congress.gov/product/pdf/IN/IN11956>; Matia Riemer, Florian Schreiner, and Jakob Wachsmuth, "Conversion of LNG Terminals for Liquid Hydrogen or Ammonia: Analysis of Technical Feasibility under Economic Considerations," Fraunhofer Institute for Systems and Innovation Research ISI, November 2022, <https://publica-rest.fraunhofer.de/server/api/core/bitstreams/67ad6976-a583-40c8-9146-223b8a384364/content>.
- 5 Christine Mui, "What to Know about DOE's Hydrogen Hubs," E&E News, October 23, 2023, <https://www.eenews.net/articles/what-to-know-about-does-hydrogen-hubs/>.
- 6 Bill McKibben, "A Smoking Gun for Biden's Big Climate Decision?," *The New Yorker*, October 31, 2023, <https://www.newyorker.com/news/daily-comment/a-smoking-gun-for-bidens-big-climate-decision>.
- 7 McKibben above cites Howarth 2022, Howarth cites his older work here: Robert W. Howarth, "Methane Emissions from Fossil Fuels: Exploring Recent Changes in Greenhouse-Gas Reporting Requirements for the State of New York," *Journal of Integrative Environmental Sciences* 17, no. 3 (2020): 69–81, <https://doi.org/10.1080/1943815x.2020.1789666>; Current coal methane estimates here: Eleanor Whittle et al., "In the Dark: Underreporting of Coal Mine Methane Is a Major Climate Risk," *Ember*, November 27, 2023, <https://ember-climate.org/insights/research/in-the-dark-underreporting-of-coal-mine-methane-is-a-major-climate-risk/#supporting-material>.
- 8 Georg Zachmann, Giovanni Sgaravatti, and Ben McWilliams, "European Natural Gas Imports," *Bruegel*, November 29, 2023, <https://www.bruegel.org/dataset/european-natural-gas-imports>.
- 9 Georgi Kantchev, "The Five-Year Engineering Feat Germany Pulled off in Months," *The Wall Street Journal*, December 8, 2022, <https://www.wsj.com/articles/natural-gas-terminal-engineering-feat-germany-11670513353>.
- 10 Georg Zachmann, Giovanni Sgaravatti, and Ben McWilliams, "European Natural Gas Imports."
- 11 Gas Infrastructure Europe, accessed November 30, 2023, <https://ieefa.org/european-lng-tracker#section1>. Source: Gas Infrastructure Europe, IEEFA • *Terminals installed in or before 2021.
- 12 "Imports of Natural Gas by Partner Country." "Germany Builds up LNG Import Terminals," *Reuters via Gas Processing & LNG News*, October 19, 2023, <http://www.gasprocessingnews.com/news/2023/10/germany-builds-up-lng-import-terminals/>.
- 13 "Imports of Natural Gas by Partner Country."
- 14 "Imports of Natural Gas by Partner Country."

References

- 15 "Council Adopts Regulation on Reducing Gas Demand by 15% This Winter," Council of the EU, August 5, 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/08/05/council-adopts-regulation-on-reducing-gas-demand-by-15-this-winter/>; "Council Formally Adopts 15% Gas Demand Reduction Target," Council of the European Union, March 30, 2023, <https://www.consilium.europa.eu/en/press/press-releases/2023/03/30/council-formally-adopts-15-gas-demand-reduction-target/>.
- 16 Zachmann et al., "European Natural Gas Imports."
- 17 Javier Blas, "Europe's Petrochemical Industry Is Heading for Death Row," Bloomberg, November 20, 2023, <https://www.bloomberg.com/opinion/articles/2023-11-20/europe-s-petrochemical-industry-is-heading-for-death-row>; Shotaro Tani and Sylvia Pfeifer, "Arcelormittal Eyes US LNG in Search for Stable Gas Supplies," *Financial Times*, November 21, 2023, <https://www.ft.com/content/a3022d0c-dec9-453c-bc9a-296a95775c0b>.
- 18 Zachmann et al., "European Natural Gas Imports."
- 19 "Council Formally Adopts Regulation to Speed up Permits for Renewable Energy Projects," Council of the EU, December 22, 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/12/22/council-formally-adopts-regulation-to-speed-up-permits-for-renewable-energy-projects/>.
- 20 "TFMI00: Dutch TTF Gas Monthly Continuous Contract Overview," MarketWatch, accessed November 30, 2023, <https://www.marketwatch.com/investing/future/tfmi00?countrycode=uk>.
- 21 "U.S. Natural Gas Exports and Re-Exports by Country," U.S. Energy Information Administration, November 30, 2023, https://www.eia.gov/dnav/ng/ng_move_expc_sl_m.htm.
- 22 "U.S. Natural Gas Exports."
- 23 "U.S. Natural Gas Exports."
- 24 "U.S. Natural Gas Exports."
- 25 Stephen York, "Issues in Focus: Effects of Liquefied Natural Gas Exports on the U.S. Natural Gas Market," EIA Annual Energy Outlook 2023, March 16, 2023, https://www.eia.gov/outlooks/aeo/IIIF_LNG/.
- 26 Victoria Zaretskaya and James Easton, "U.S. LNG Export Capacity to Grow as Three Additional Projects Begin Construction," U.S. Energy Information Administration (EIA), September 6, 2022, <https://www.eia.gov/todayinenergy/detail.php?id=53719>.
- 27 "Methane Emissions Reduction Program," United States Environmental Protection Agency, accessed November 30, 2023, <https://www.epa.gov/inflation-reduction-act/methane-emissions-reduction-program>.
- 28 Jonathan Ramseur, "Inflation Reduction Act Methane Emissions Charge: In Brief," Congressional Research Service, August 29, 2022, <https://crsreports.congress.gov/product/pdf/R/R47206>.
- 29 Kana Inagaki, "Big LNG Buyers and Producers to Tighten Methane Monitoring," *Financial Times*, July 17, 2023, <https://www.ft.com/content/2cbb9457-61b7-4d6a-8d26-28c79f48777e>; "Coalition for LNG Emission Abatement toward Net-Zero- Sharing LNG Project-Level Methane Reduction Measures," Japan Organization for Metals and Energy Security (JOGMEC), July 20, 2023, https://www.jogmec.go.jp/english/news/release/news_10_00041.html.

References

- 30 Ben Cahill and Arvind Ravikumar, "How to Cut Methane Emissions from Global Gas," Center for Strategic and International Studies, November 14, 2023, <https://www.csis.org/analysis/how-cut-methane-emissions-global-gas>.
- 31 "The Global Methane Pledge – Global Methane Tracker 2022 – Analysis," International Energy Agency (IEA), accessed November 30, 2023, <https://www.iea.org/reports/global-methane-tracker-2022/the-global-methane-pledge>; Paul Bledsoe and Ed Gresser, "Alliance for Clean Trade: A Framework Proposal for a New Climate and Trade Alliance between the U.S., EU, and Allies," Progressive Policy Institute, June 13, 2023, <https://www.progressivepolicy.org/publication/alliance-for-clean-trade/>.
- 32 Paul Bledsoe, "The Climate Case for Expanding U.S. Natural Gas Exports," Progressive Policy Institute, January 19, 2023, <https://www.progressivepolicy.org/publication/the-climate-case-for-expanding-us-natural-gas-exports/>.



The Progressive Policy Institute is a catalyst for policy innovation and political reform based in Washington, D.C. Its mission is to create radically pragmatic ideas for moving America beyond ideological and partisan deadlock.

Founded in 1989, PPI started as the intellectual home of the New Democrats and earned a reputation as President Bill Clinton's "idea mill." Many of its mold-breaking ideas have been translated into public policy and law and have influenced international efforts to modernize progressive politics.

Today, PPI is developing fresh proposals for stimulating U.S. economic innovation and growth; equipping all Americans with the skills and assets that social mobility in the knowledge economy requires; modernizing an overly bureaucratic and centralized public sector; and defending liberal democracy in a dangerous world.

© 2023
PROGRESSIVE POLICY INSTITUTE
ALL RIGHTS RESERVED.

PROGRESSIVE POLICY INSTITUTE
1919 M Street NW,
Suite 300,
Washington, DC 20036

Tel 202.525.3926
Fax 202.525.3941

info@ppionline.org
progressivepolicy.org